

REMARKS

Claim 38 is being canceled because it is a use claim and use claims are not allowed in the United States PTO.

Claim 47 is being canceled because it is dependant on claim 38. Claims 19-37, 39-46 are being amended. Claim 48 is new.

The process according to this invention consists of reacting an aliphatic alcohol ROH with carbonyl fluoride COF_2 in the presence of NaF, sodium fluoride in excess. (Specification, page 1, lines 3-7)

Carbonyl fluoride is produced by the reaction of phosgene, COCl_2 , with NaF. Although this reaction has been known for several years, substantial advantages are achieved by using NaF very pure, as a powder with grains having a specific surface greater or equal to $0.1 \text{ m}^2/\text{g}$. No carbonyl fluorochloride, COFCl is formed (page 5, lines 7-9).

In the first step, which involves the formation of carbonyl fluoride, the temperature is 25°C to 120°C (page 5, line 21) or preferably 35°C to 80°C (page 7, lines 25-26)

In the second step which covers the reaction of an aliphatic alcohol with carbonyl fluoride, the temperature is -20°C to 50°C (page 3, lines 7-8).

The gases evolved in step 1 pass through a condenser kept at -20°C to -40°C and are recycled (page 8, line 11).

Applicants' process produces an alkyl fluoroformate with excellent yield, high purity (page 3 line 16-18; page 8, lines 16-26). Purity greater than 99% is stated on page 9, lines 13-14.

Another novel feature of this invention resides in the use of a solvent which does not dissolve the final products, the alkyl fluoroformates but dissolves the impurities.

The Examiner has rejected claims 19-22, 24, 25, 39, 40-46 because of the Aldrich reference. Reconsideration is respectfully urged.

The reaction of an alcohol with carbonyl fluoride is carried out by Aldrich at 100-200°C in an autoclave under pressure, see page 11, left column last line to the right column, line 1. No yield and no statement of the purity of the product, the fluoroformate, is given. Also the purity of the carbonyl fluoride is not reported. It is significant that Aldrich states on page 11, right column, line 4 that the intermediate fluoroformate was not isolated

On page 15 left column, line 6 Aldrich states that in the preparation of the fluoroformate of ethylene glycol the temperatures is -80°C. It is submitted that such a low temperature is not advantageous from the economical point of view.

It is not disputed that on page 14, right column Aldrich describes the preparation of carbonyl fluoride by the reaction of phosgene with NaF. However, it is submitted that chlorinated products including carbonyl

fluorochloride must be present although not stated. Aldrich makes no determination of the purity of the carbonyl fluoride. In the Aldrich reference page 14, right column, in the Experimental part, there is a note which refers to page 11, where at the bottom, there is a statement that the preparation of carbonyl fluoride is carried out according to Fawcett, the other reference cited by the Examiner.

The Examiner has rejected claims 29-38 because of the Fawcett publication. Also this reference describes reactions totally different from the present invention. On page 4275, left column, the elimination of carbon dioxide to convert a C=O group to a -CF₂ group is mentioned. It is stated that this transformation occurs with ease: $(\text{CH}_3)_2 \text{NC=O} + \text{COF}_2 \rightarrow (\text{CH}_3)_2 \text{NCF}_2 + \text{CO}_2$.

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This reference describes the reaction of cyclohexanone, in the presence of a catalytic amount of N,N-dimethylformamide or of pyridine which yielded the distillable adduct cyclohexyl fluoroformate.

It is not disputed that on page 4275 left column the reference states that carbonyl fluoride is obtained by reaction of phosgene with NaF. However, no mention is made of the purity of this product. It is submitted that this product must contain compounds containing chlorine including carbonyl fluorochloride.

The reaction of carbonyl fluoride with an aliphatic alcohol is not even mentioned.

Fawcett used two condensers see page 1278, left column, last line continuing in the right column. One condenser is vertically mounted on top of the other. One condenser is kept at a temperature of -50°C to -35°C and the other condenser is kept at -70°C up to -78°C . Under these conditions phosgene reacts with difficulty, the yield is only 70-80% and the purity is only 95%.

On the contrary, according to the process of the present application with the pure NaF only one condenser is sufficient and it is not necessary to keep the temperature at -78°C . Further, the yield is 98% and the purity is greater than 99% (page 10, line 25-27).

In the Office Action page 3, line 1, the Examiner has stated that claims 23, 26, 27 and 28 are objected to because they depend on rejected claims. Reconsideration is respectfully urged. Claims 23 and 26 are dependant on claim 19 which has not been rejected. Claim 27 depends on claim 19. Claim 28 depends on claim 22 which depends on claim 19. It is, therefore, submitted that claims 23, 26, 27 and 28 should be considered.

It is submitted that claims 19-37 and 39-46 and 48 are allowable and a prompt notice of allowance is respectfully urged.

Respectfully submitted,

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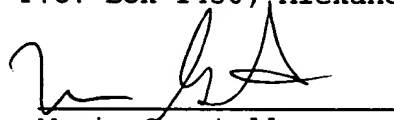
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on October 8, 2003.



Maria Guastella